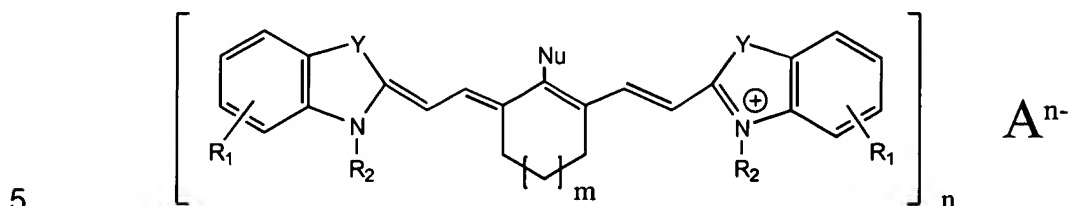


CLAIMS

What is claimed is:

1. A method for preparing infrared absorbing cyanine dyes of the structure:



in which:

R_1 is hydrogen, or R_1 is one or more alkyl, alkoxy, carboxyl, nitro, cyano, trifluoromethyl, acyl, alkyl or aryl sulfonyl, or halogen groups, or R_1 is the atoms necessary to form a substituted or unsubstituted benzo group;

10 R_2 is alkyl, aryl, or aralkyl;

Nu is halogen, substituted or unsubstituted phenoxy, substituted or unsubstituted thiophenoxy, or substituted or unsubstituted diphenylamino;

Y is O, S, NR' , or $C(R')_2$, where R' is hydrogen or alkyl;

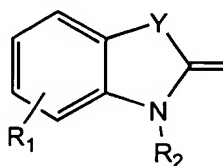
m is zero or one;

15 n is two, three, or four; and

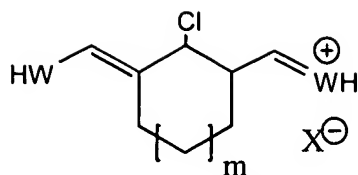
A is an aromatic group that has n sulfonate groups;

the method comprising the steps of:

a) reacting an activated methylene group containing a heterocyclic base of the structure:



20 with a compound of the structure:



and forming an intermediate in a reaction mixture;

in which W is O or Ar-N, Ar is an aromatic group, X^- is an anion, and m is zero or one, and

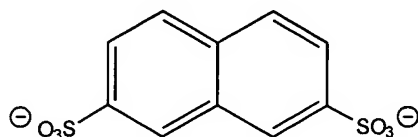
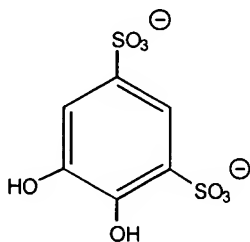
b) adding a salt of A to the reaction mixture; and

5 c) isolating the infrared absorbing cyanine dye;

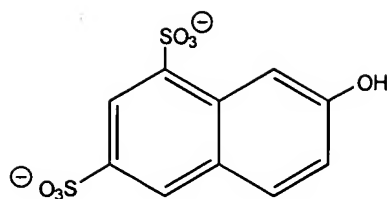
in which the infrared absorbing cyanine dye is the only compound isolated in the method.

2. The method of claim 1 in which R_1 is hydrogen; R_2 is methyl, ethyl, *n*-propyl, or *n*-butyl; Nu is chloro, phenoxy, thiophenoxy, or diphenyl amino; and
10 Y is $C(CH_3)_2$, O, or S.

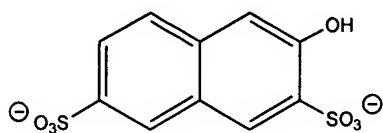
3. The method of claim 2 in which A is selected from the group consisting of biphenyl-4,4'-disulfonate; diphenyl ether-4,4'-disulfonate; stilbene-2,2'-disulfonate; 2,2'-dihydroxy-4,4'-dimethoxybenzophenone-5,5'-disulfonate,



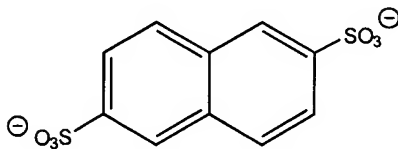
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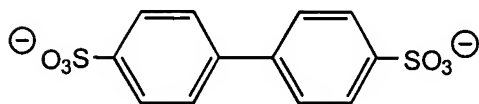
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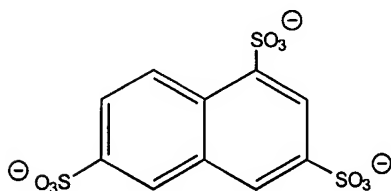
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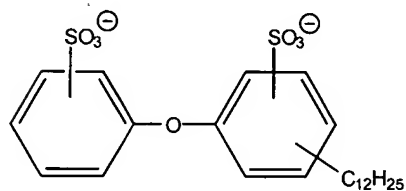
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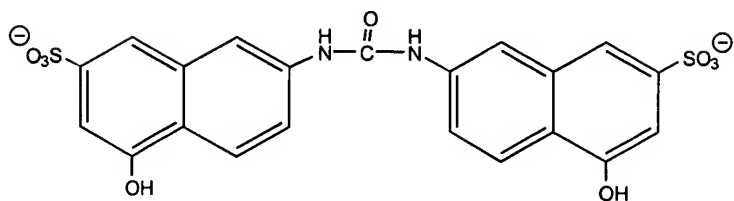
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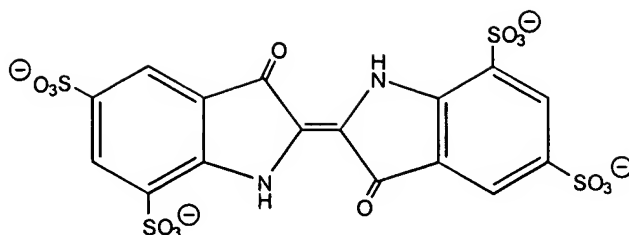
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,



, and



4. The method of claim 2 in which n is 2 and A is 4,5-dihydroxy-1,3-benzenedisulfonate.

5. The method of claim 1 in which Nu is chloro.

5 6. The method of claim 5 in which R_1 is hydrogen; R_2 is methyl, ethyl, n -propyl, or n -butyl; and Y is $C(CH_3)_2$, O , or S .

7. The method of claim 6 in which n is 2 and A is 4,5-dihydroxy-1,3-benzenedisulfonate.

8. The method of claim 7 in which Y is $C(CH_3)_2$.

10 9. The method of claim 8 in which n is 2 and A is 4,5-dihydroxy-1,3-benzenedisulfonate.

10. The method of claim 1 additionally comprising, after step a) and before step b), an additional step of adding a substituted or unsubstituted phenoxy, a substituted or unsubstituted thiophenoxy, or a substituted or unsubstituted diphenylamino compound to the reaction mixture.

11. The method of claim 10 in which R_1 is hydrogen; R_2 is methyl, ethyl, n -propyl, or n -butyl; Nu is phenoxy, thiophenoxy, or diphenyl amino; and Y is $C(CH_3)_2$, O , or S .

12. The method of claim 11 in which A is 4,5-dihydroxy-1,3-benzenedisulfonate.

13. The method of claim 12 in which Y is $C(CH_3)_2$.

14. The method of claim 13 in which n is 2 and A is 4,5-dihydroxy-1,3-benzenedisulfonate.

15. The method of claim 1 in which the dye is isolated by filtration.

16. The method of claim 15 in which R_1 is hydrogen; R_2 is methyl, ethyl, *n*-propyl, or *n*-butyl; Nu is chloro, phenoxy, thiophenoxy, or diphenyl amino; and Y is $C(CH_3)_2$, O, or S.

5 17. The method of claim 16 in which A is 4,5-dihydroxy-1,3-benzenedisulfonate.

18. The method of claim 1 in which:

R_1 is hydrogen; R_2 is methyl, ethyl, *n*-propyl, or *n*-butyl; Nu is chloro; Y is $C(CH_3)_2$, O, or S; and A is 4,5-dihydroxy-1,3-benzenedisulfonate; and

10 the method consists essentially of steps a), b), and c).

19. The method of claim 1 in which:

R_1 is hydrogen; R_2 is methyl, ethyl, *n*-propyl, or *n*-butyl; Nu is phenoxy, thiophenoxy, or diphenyl amino; R_2 is methyl, ethyl, *n*-propyl, or *n*-butyl; Y is $C(CH_3)_2$, O, or S; and A is 4,5-dihydroxy-1,3-benzenedisulfonate; and

15 the method consists essentially of steps a), b), c), and an additional step of adding a substituted or unsubstituted phenoxy, a substituted or unsubstituted thiophenoxy, or a substituted or unsubstituted diphenylamino compound to the reaction mixture.